Enhanced terminology acquisition during an ESP course: a multicompetence approach

Elvira R. Skornyakova & Ekaterina V. Vinogradova

Saint Petersburg Mining University
Saint Petersburg, Russia

ABSTRACT: The current study examines ways of enhancing terminology acquisition during an English for specific purposes (ESP) course. The devised terminology enhancement model includes a variety of language learning activities, as well as assists in obtaining a number of competencies. The research framework consists of the following key factors: technical vocabulary learning strategies; language skills mastering; technology readiness; universal competencies. The goal of the study was to determine the profiles of terminology acquisition and the multicompetence approach, and their relationship within the terminology enhancement model and universal competencies mastering. A novel technical vocabulary learning approach was carried out in a treatment group of 64 second-year students in a Russian technical university. The overall result of the students' knowledge of terminology has significantly improved, alongside the development of their core universal competencies: critical thinking, project work, team building, leadership, communication, cross-cultural interaction and self-development, which makes future engineers highly competitive, ready to face challenging career paths.

Keywords: Terminology acquisition, ESP course, multicompetence approach, terminology enhancement model

INTRODUCTION

According to Russian standards of higher education, future engineering specialists should acquire a number of universal and professional competencies in the educational process in order to meet the key demands of the volatile and competitive labour market. In view of those demands, there arises a need to …*analyse professional goals in programs* [1] and develop students' competencies …*in order to adapt or relate expertise needed for future job with the graduates' competence assessment* [2]. It should be indicated that the quality of students' professional education is connected to such aspects as *academic staff, course content and educational environment* [3]. As Hadgraft mentioned …*engineering students* should combine *fundamental knowledge of many disciplines, not just mathematics and physics* [4].

Thus, in ESP courses it is of vital importance to develop students' professional language skills together with such universal competencies as critical and systematic thinking, leadership, communication, cross-cultural interaction, self-development and self-management, which are fundamental for graduates' adaptability to constantly evolving new challenges and meeting the requirements of potential employers. A good command of professional language, both native and foreign, is an implicit advantage for young engineers.

LITERATURE REVIEW

While learning foreign languages, students face a number of obstacles: perceiving and remembering new vocabulary, understanding its meaning and connotations [4]. This is particularly relevant in case of professional terminology learning during an ESP course at a technical university. Teaching staff have a great variety of educational tools contributing to the attainment of required competencies through using technical vocabulary strategies. In this regard, the transition from a teacher-centred approach to a student-centred approach should be emphasised [5].

Modern education involves comprehensive ICT means. There is a number of on-line courses for students to choose from that are …*focused on information technologies in learning and developed for accessing to learning materials, such as texts, audio, video materials* [6], and also models …*aimed at cultivating technically relevant environment … and fostering translation skills* [7]. Modern technologies provide …*ways of overcoming the arising difficulties in professionally-oriented translation* [8]; for example, involving computer-assisted translation tools aimed at improving …*the skills of texts processing and analysing* [9].

Technical vocabulary acquisition has been recognised as a pivotal part in ESP learning. Schmitt's taxonomy is represented by discovery vocabulary learning strategies and consolidation strategies [10]. Discovery strategies mostly include memorising, repetition and note-taking, while the consolidation ones require a more in-depth look at the meaning of the words, their ascribing to memory. The current study employs terminology acquisition techniques through memory, cognitive, metacognitive and social learning strategies, which contribute to the effective, long-term retention, and creative and appropriate use of specialised vocabulary.

The crucial role of technical vocabulary learning strategies in ESP courses has been widely acknowledged by numerous researchers [11][12]. To achieve better learning outcomes, theoretical insights along with empirical evidence have been demonstrated in regard to *…integration of newly learned L2 words into the mental lexicon* [13], *cross-situational learning of novel alien language vocabulary and grammar roles of those words* [14], *blended learning approach* [15], an ESP course for *metallurgy students* [16], etc.

Specialised vocabulary acquisition in different specialty streams have been discussed in regard to *ESP training of engineer physicists* [17], teaching technical vocabulary to physics undergraduates [18], *translation loan-words for mining and geological terminology* [19], professional-oriented communication in English for students of geological specialties [20].

To recapitulate, the issue of technical vocabulary acquisition could be considered a multi-faceted, complex and competence development phenomenon requiring special attention and a comprehensive multicompetence vocabulary enhancement approach addressed in the current study.

METHODS

To solve vocabulary learning problems and foster the development of well-rounded specialists, it is necessary to work within a framework based on a multicompetence approach.

In Saint Petersburg Mining University (SPMI), Russia, there are continuous efforts to advance students' competence through well-designed and motivating assignments. In this article, the authors consider an aspect of the ESP course taught to the second-year students of different specialties (groups of 13-16 students). This aspect of vocabulary entails terminology acquisition in their professional field in the English language and its translation into their native language, i.e. Russian. By the end of the course the students' active vocabulary should include a list of approximately 200 terms (in SPMI referred to as *lexical minimum* [21] or LM) that is precisely compiled and regularly updated.

In this study, a comprehensive model was derived to enhance professional vocabulary acquisition and develop a number of competencies during English classes. The model can be applied as an additional task embedded into the course programme. The model is presented in Figure 1.

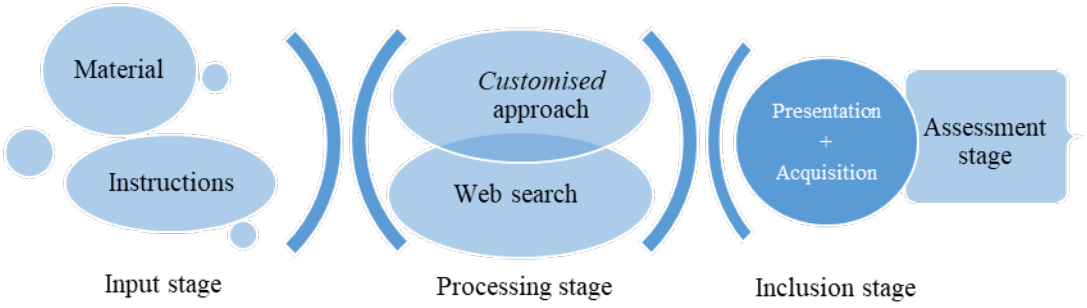

Figure 1: Terminology enhancement model for an ESP course.

The model includes *four successive stages* distributed throughout the academic term:

The *input stage* (the beginning of the course term) stipulates for arrangement activities. The words and word combinations or terminology units, from the LM list are equally distributed between students in the group, so that each student works with their own portion of terms. For example, in a group of 13, every student gets about 15 terms (200 terms for 13 students, about 15 terms per student). The students are then instructed that their aim is to search for each given term in any authorised and reliable Internet source, validate its usage and, subsequently, explain it to their groupmates. They are also informed about the deadline and time limits (during the course, every student is allocated 15 minutes at the end of class to present their results). The second-year students have not yet begun their specialisations as specialised disciplines are taught in the 3rd and 4th years of study. So, the students come across most of the notions and phenomena in the LM for the first time.

During the *processing stage*, the students work independently carrying out Web searches (using educational, professional, encyclopaedic, entertainment and other Web sites) on their portion of terms and prepare material in any form they feel confident about. The groups are encouraged to carry out linguistic surfing - search for general information

and important and interesting facts about the notion determined by the term. The task involves personalised (customised) approach to the students' work, so that they could unleash their potential, and use any method or technique. Lack of performance limitations or any frames increases students' motivation and engagement.

The *inclusion stage* implies that the students are to present the results of their terminological searches to the groupmates, so that everybody gets an insight into every term and the notion it designates. During the study outlined in this article, the students tacitly settled upon PPT presentations. For instance, the presentations contained: visual content (pictures in different formats, multimedia files, music) and basic statements together with abbreviations, professional jargon, etc, used by the student when presenting the term. Examples of the students' works are shown in Figure 2.

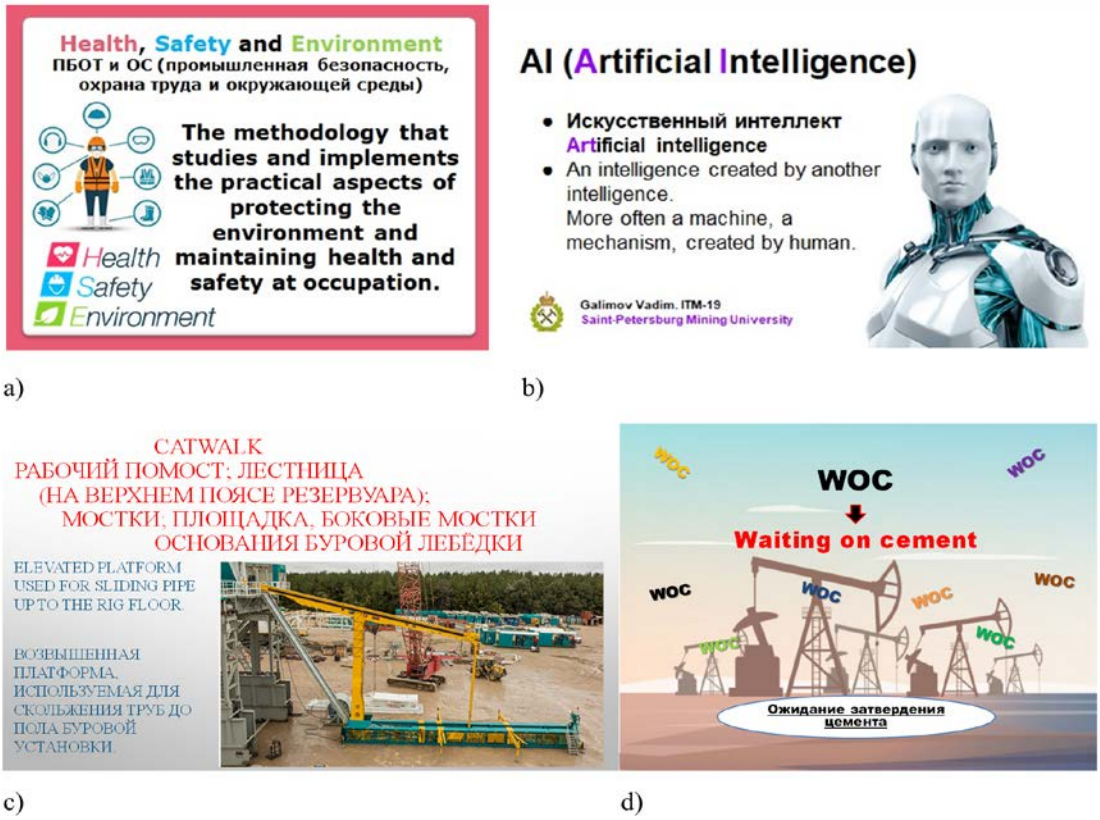

Figure 2: Examples of the students' works that were the starting point for further investigation and mutual learning (both the target language and the native language are included); authors: Veronika Zhilyayeva; b) Vadim Galimov; c) Svyatoslav Ovchinnikov; and d) Niyaz Gareev.

However, the students included also interactive activities, such as quizzes, crosswords, etc, trying to avoid traditional presentations in preference of intercommunication with the audience. The presenter had a role of an expert regarding the term, and was able to answer the follow-up questions from the audience, discuss and explain the notion and related aspects.

The final stage is the assessment of the acquired vocabulary that takes place at the end of the ESP course.

The assessment method is also crucial. Douglas emphasises that testing assignments in ESP courses have to be thoughtfully prepared, considering both the language knowledge assessment and the specific discipline content [22]. Thus, a test was devised to assess the expected competencies. The test includes a lexical and grammatical part. In this article, the focus is on the first one. It comprises of three tasks:

1) translation from English into the native language;
2) *fill-in the gaps* task - 12 original sentences from authentic sources lacking one word (a term from the LM list); each sentence is constructed in such a way that it would be possible to comprehend its meaning identify the missing term;
3) creative writing task - *Describe in your own words the scope and features of your future profession* (about 150 words).

The complex test verifies if students have acquired the terminology from the list; the result is presented in points with a maximum of 50 points for 100% fulfilment. The grading system in the Russian Federation stipulates four grades - 5 (excellent); 4 (good); 3 (satisfactory); and 2 (failed). Each spelling mistake, misunderstanding of the content and lack of terminology knowledge deprive the student of a point. When students fulfil 85% of the assignment successfully, they are given an excellent grade. When the percentage of correctness is 65-84%, the grade is good - 4. For 45-64% success rate, the learners get a satisfactory grade - 3. Results below 44% are considered as failed.

RESULTS

The abovementioned test was devised by the authors of this article, and introduced at the end of the ESP course for intermediate groups in the 2019-2020 academic year. Table 1 below presents the results of the test taken by a control group of 58 students who were taught in a traditional way without the terminology enhancement model.

	Oil and gas specialty	IT specialty	Mineral processing specialty	Mining specialty	Students - total
Level of English	Intermediate	Intermediate plus	Intermediate	Intermediate	
Number of students	15	13	14	16	58
5 - excellent	2	5	7	1	15
4 - good	8	6	6	12	32
3 - satisfactory	5	2	1	1	9
2 - failed	-	-	-	2	2

Table 1: Results of the ESP test verifying the acquisition of professional terminology (2019-2020 academic year).

From Table 1, it can be seen that only 26% of the students (15 persons) had an excellent mark in the 2019-2020 course; half of the students (32 persons or 55%) had a good mark; 16 % (9 students) were graded as *satisfactory*; and 3% of the students failed the test (2 persons). To improve the results, in the 2020-2021 academic year, the authors developed and introduced the terminology enhancement model aimed not only at the acquisition of LM terminology, but also at multicompetence development and motivation enhancement.

The treatment group students of the 2020-2021 ESP course took the same final test after they had practiced vocabulary acquisition through the model. Their results provide evidence of the model's effectiveness, as shown in Table 2.

	Oil and gas specialty	IT specialty	Mineral processing specialty	Mining specialty	Students - total
Level of English	Intermediate	Intermediate plus	Intermediate	Intermediate plus	
Number of students	21	13	14	16	64
5 - excellent	16	12	10	7	45
4 - good	5	1	4	8	18
3 - satisfactory	-	-	-	1	1
2 - failed	-	-	-	-	-

Table 2: Results of the ESP test verifying the acquisition of professional terminology (2020-2021 academic year).

Figure 1 shows the outcomes of the students who studied the LM terminology in a traditional way compared to that of the students whose studies were enhanced by the terminology acquisition model as a supplementary activity integrated into the educational programme. The number of excellent grades increased by 44% from 26% in the control group to 70% in the treatment group thereby decreasing the number of good grades from 55% to 28% and almost eliminating the satisfactory grades (16% vs. 2%). Especially satisfying was the absence of the failed grade after the model's application and a substantial improvement of general vocabulary evidenced by the test's results.

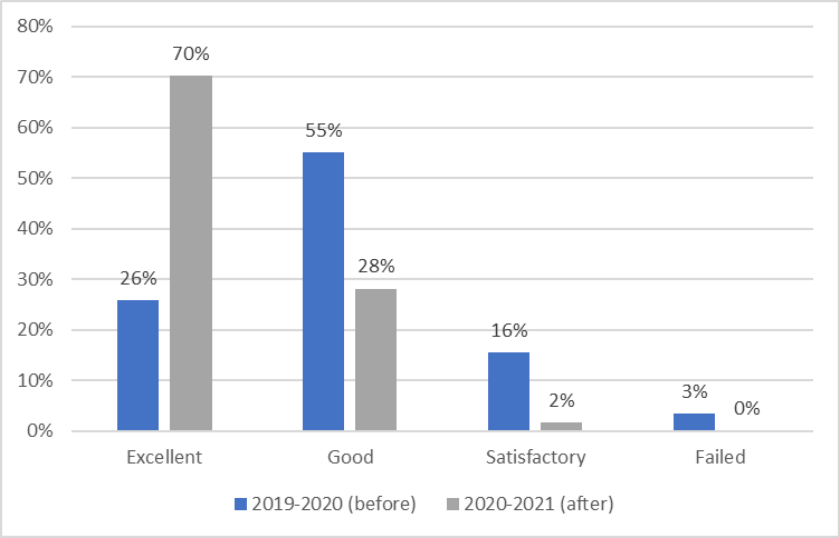

Figure 1: Comparison of test results before and after the model's introduction into the educational process.

The terminology enhancement model includes a variety of language learning activities (reading, writing, speaking, listening), as well as assisting in competence development. Specifically, the input stage advances self-development and the ability to implement projects within the allocated time limits. The processing stage develops systematic and critical thinking through Internet searches and the analysis of information. The inclusion stage fosters the development of communicative and teamwork skills, as all students depend, and rely on, each other in the process of terminology understanding and remembering.

Thus, all students within a group get a general idea of every term during their presentations and learn the terms in a meaningful way. They search for information, learn how to use ICT and distinguish between relevant and irrelevant information and how to stay within the allotted time. They develop their presentation skills (speaking in front of public) and get valuable communicative practice in the process.

CONCLUSIONS

In the study presented in this article, an attempt was made to enhance terminology acquisition by students in an English for Specific Purposes (ESP) course at a technical university in Russia. A terminology enhancement model was developed and introduced to the EPS course in the 2020-2021 academic year. It proved to be an effective learning tool, covering all the language learning aspects (reading, writing, speaking, listening), as well as assisting in the development of numerous competencies.

The new model was tested in a treatment group of 64 second-year students and proved to be effective in comparison with the control group of 58 students of the same level of English knowledge and of the same specialties. As a result of the model's implementation, future engineering specialists mastered core universal competencies enabling them to face new challenges in constantly changing socio-economic conditions, to be highly-competitive, to know how to react in non-standard situations. The present study highlights the need for strategies of vocabulary acquisition in technical universities that would be beneficial in preparing engineering specialists for their future career paths and in developing core universal competencies through a multicompetence approach.

The authors plan to explore the terminology enhancement model further, including more specific criteria, such as various language levels, gender, motivation, specialty, etc. They also intend to involve a larger cohort of motivated engineering students eager to enhance their language skills. It is envisaged that the model will evolve, be reviewed and systematised thus providing greater theoretical and empirical insights into the issues addressed in this article.

ACKNOWLEDGEMENTS

This research was carried out within the state assignment of the Ministry of Science and Higher Education of the Russian Federation for 2021, No. FSRW-2020-0014.

REFERENCES

1. Goman, Y.V., Development of the dialogue skills in a foreign language in comparing of oil benchmarks. *J. of Physics: Conf. Series*, 1384, **012013** (2019).
2. Goldobina, L. and Orlov, P., BIM technology and experience of their introduction into educational process for training bachelor students of major 08.03.01 construction. *Zapiski Gornogo Instituta*, 224, 263-272 (2017) (in Russian).
3. Hardgraft, R., New curricula for engineering education: experiences, engagement, e-resources. *Global J. of Engng. Educ*., 19, **2**, 112-117 (2017).
4. Afzal, N., A study on vocabulary-learning problems encountered by BA English majors at the university level of education. *Arab World English J*., 10, **3**, 81-98 (2019).
5. Radzali, U.S., Mohn-Yusof, K. and Phang, F.A., Changing the conception of teaching from teacher-centred to student-centred learning among engineering lecturers. *Global J. of Engng. Educ.*, 20, **2**, 120-126 (2018).
6. Murzo, Y., Sveshnikova, S. and Chuvileva, N., Method of text content development in creation of professionally oriented online courses for oil and gas specialists. *Inter. J. of Emerging Technologies in Learning*, 14**, 17**, 143-152 (2019).
7. Pushmina, S.A. and Carter, E.V., Addressing translation challenges of engineering students. *Global J. of Engng. Educ*., 23, **2**, 150-155 (2021).
8. Borisova, Y., Maevskaya, A. and Skornyakova, E., Specific purposes texts' translation training for mining and civil engineering specialties students. *The European Proc. of Social and Behavioural Sciences*, 98, 130-138 (2020).
9. Vinogradova, E., Kornienko, N. and Borisova, Y., Cat and Lingvo Tutor tools in educational glossary making for non-linguistic students. *The European Proc. of Social and Behavioural Sciences*, 98, 400-409 (2020).
10. Schmitt, N. and McCarthy, M., *Vocabulary: Description, Acquisition and Pedagogy*. Cambridge: Cambridge University Press (1997).
11. Wanpen, S., Sonkoontod, K. and Nonkukhetkhong, K., Technical vocabulary proficiencies and vocabulary learning strategies of engineering students. *Procedia - Social and Behavioral Sciences*, 88, 312-320 (2013).
12. Deniko, R., Shchitova, O., Shchitova, D. and Lan, N., Learning terminology in the age of higher education internationalization: problems and solutions. *Procedia - Social and Behavioral Sciences*, 215, 107-111 (2015).

13. Boddaert, G., Cornut, C. and Casalis, S., Integration of newly learned L2 words into the mental lexicon is modulated by vocabulary learning method. *Acta Psychologica*, 212, **103220** (2021).
14. Rebuschat, P., Monaghan, P. and Schoetensack, C., Learning vocabulary and grammar from cross-situational statistics. *Cognition*, 206, **104475** (2021).
15. Tosun, S., The effects of blended learning on EFL students' vocabulary enhancement. *Procedia - Social and Behavioral Sciences*, 199, 641-647 (2015).
16. Rogova, I.S., Sveshnikova, S.A. and Troitskaya, M.A., Designing an ESP course for metallurgy students. *The European Proc. of Social and Behavioural Sciences*, 98, 372-385 (2020).
17. Andrianova, S. and Makarova, A., Terminological dictionaries in ESP training of engineer physicists. *Procedia - Social and Behavioral Sciences*, 236, 230-234 (2016).
18. Rusanganwa, J., Multimedia as a means to enhance teaching technical vocabulary to physics undergraduates in Rwanda. *English for Specific Purposes*, 32, **1**, 36-44 (2013).
19. Sishchuk, Y., Zaimstvovaniya iz nemetskogo yazyka v russkoy gorno-geologicheskoy terminologii. *Zapiski Gornogo Instituta*, 219, 504-507 (2016) (in Russian).
20. Gerasimova, I., Osobennosti professional'no-orientirovannogo obshcheniya na angliyskom yazyke studentov geologicheskikh spetcialnostey. *Zapiski Gornogo Instituta*, 187, 255-257 (2010) (in Russian).
21. Varlakova, E.A. and Goman, Y.V., Formirovaniye leksicheskih navikov na angliyskom yazike u studentov neftegazovogo fakulteta. *Sovremennoye Obrazovaniye: Soderzhaniye, Tekhnologii, Kachestvo*, 1, 533-535 (2019) (in Russian).
22. Douglas, D., Book review: assessing English for professional purposes. *English for Specific Purposes*, 59, 42-44 (2020).

BIOGRAPHIES

Elvira R. Skornyakova is a lecturer of English at Saint Petersburg Mining University in Saint Petersburg, Russia. She graduated a specialist of foreign languages teaching from the State University in Saint Petersburg, Russia, and attained a Doctor of Philosophy in philological sciences from the Institute of Linguistic Studies of the Russian Academy of Sciences, Saint Petersburg in 2006. Her areas of research interests are connected with content and language integrated learning, and teaching English for specific purposes and translation, as well as comparative linguistics. She teaches English to engineering Bachelor students and specialists.

Ekaterina V. Vinogradova is a lecturer of English at Saint Petersburg Mining University in Saint Petersburg, Russia. She graduated with a Master degree in linguistics from Saint Petersburg State University in 2013. Her research interests are in the field of terminology science, comparative linguistics, as well as teaching techniques and educational methods regarding English for specific purposes and translation. She teaches English to engineering Bachelor students and specialists.